

## Glycemic control and treatment satisfaction in Saudi diabetic children on insulin pump therapy

**To the Editor:** Since the introduction of continuous subcutaneous insulin infusion (CSII) in the late 1970s, it has become apparent that the use of insulin pump therapy has many potential benefits for children with type 1 diabetes. Insulin pump therapy improves glycemic control, reduces hypoglycemia, decreases episodes of recurrent diabetic ketoacidosis (DKAs) and improves quality of life.<sup>1,2</sup> In this study, we assessed the parents' satisfaction with insulin pump therapy and compared it with the conventional insulin therapy by using the Diabetes Treatment Satisfaction Questionnaire (DTSQs-parent) method.

Nine Saudi children with type 1 diabetes mellitus were started on 508 *MiniMed* insulin pump therapy. All patients were on conventional insulin (CI) therapy, which included two injections of insulin per day of NPH and regular insulin before shifting them to CSII. The Diabetes Treatment Satisfaction Questionnaire (DTSQs-parent) was used before and 6 months after insulin pump initiation. DTSQs-parent included 9 questions about treatment satisfaction with a score from 0 to 6. The questions involved treatment satisfaction, treatment convenience, treatment flexibility, and diabetes knowledge gained during treatment and the frequency of unacceptable high and low blood sugar levels. All patients had type 1 diabetes mellitus for a mean duration of  $3.3 \pm 1.5$  years. The mean age of these children was  $11.4 \pm 3.2$  years. They were followed on insulin pump therapy for a mean duration of  $20.4 \pm 7$  months.

During the 6 months prior to insulin pump therapy initiation, the mean HbA1c was  $10.1 \pm 1.2\%$ , the mean blood glucose level was  $233 \pm 33.6$  mg/dL and the mean frequency of hypoglycemic episodes per month was  $2.9 \pm 0.9$ . The total numbers of hypoglycemic convulsive and DKA episodes were 2 and 7 episodes, respectively. Six months post-insulin therapy, the mean HbA1c was  $7.3 \pm 0.5\%$  ( $P=0.0002$ ), the mean blood glucose level was  $155 \pm 33.2$  mg/dL ( $P=0.002$ ) and the mean frequency of hypoglycemic episodes per month was  $1.7 \pm 0.5$  ( $P=0.002$ ). There was no report of hypoglycemic convulsion or coma during CSII therapy. The treatment satisfaction score was 26.5 pre-insulin pump therapy and improved to a mean score of 34.3 post-insulin pump therapy ( $P<0.0001$ ).

A tremendous amount of data has shown that intensive diabetes management with CSII is a durable and an effective means of optimizing glycemic control in pediatric patients and may improve their quality of life.<sup>1</sup> We showed that insulin pump therapy was effective in treating 9 Saudi type 1 diabetic children. Their parents were more satisfied with this modality of intensive insulin therapy compared with CI therapy. Intensified insulin therapy using external pumps provides users with flexibility in their eating schedule and an ability to correct high and low blood sugar readings by adjusting the insulin boluses and basal insulin infusion rate. In this trial, the rate of hyperglycemic and hypoglycemic episodes was less on CSII therapy. Meals were covered with the ultra short-acting insulin, which minimized postprandial hypo- and hyperglycemia. CSII therapy also fits into children's lifestyle and different

daily activities. The basal infusion rate was reduced during exercise and some children were placed on a temporary basal rate during sports. Some parents felt that they gained more information on diabetes management and diet therapy during insulin pump therapy. Other children felt that they were able to predict blood glucose level based on what they ate. They were able to control blood glucose by calculating the appropriate correction for the insulin bolus dose. Some children reported that frequent checking of blood glucose was more enjoyable for them because they can easily correct high readings through the pump and without having an injection. In conclusion, CSII improved glycemic control in Saudi diabetic children and improved their quality of life. Parents of children on insulin pump therapy were more satisfied with this modality of intensive insulin treatment.

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